WHAT IS CLAIMED IS:

1. A reversible electrodeposition device, comprising:

  - a first substrate having an electrically conductive material associated therewith;

  - a second substrate having an electrically conductive material associated therewith;

  - a nucleation layer at least partially covering at least one of the electrically conductive materials of the first and second substrates;

  - an electrochemical medium contained within a chamber positioned between the first and second substrates which comprises:

    - at least one solvent;

    - an anodic electroactive material;

    - a cathodic electroactive material; and

    - a redox buffer.

2. The reversible electrodeposition device according to claim 1, wherein the redox buffer is more easily reduced than the cathodic material.

3. The reversible electrodeposition device according to claim 1, wherein the redox buffer is more easily oxidized than the anodic material.

4. The reversible electrodeposition device according to claim 1, wherein the redox buffer comprises: a first component that is more easily reduced than the cathodic material; and a second component that is more easily oxidized than the anodic material.

5. The reversible electrodeposition device according to claim 1, wherein the cathodic material comprises a salt of an active metal.

6. The reversible electrodeposition device according to claim 1, wherein the concentration of the redox buffer ranges from approximately 1mM to approximately 50mM.

7. The reversible electrodeposition device according to claim 1, wherein the electrochemical medium further comprises a complexing agent.

8. The reversible electrodeposition device according to claim 7, wherein the redox buffer is more easily reduced than the cathodic material.

9. The reversible electrodeposition device according to claim 7, wherein the redox buffer is more easily oxidized than the anodic material.

10. The reversible electrodeposition device according to claim 7, wherein the redox buffer comprises: a first component that is more easily reduced than the cathodic material; and a second component that is more easily oxidized than the anodic material.

11. The reversible electrodeposition device according to claim 7, wherein the cathodic material comprises a salt of an active metal.

12. The reversible electrodeposition device according to claim 7, wherein the concentration of the redox buffer ranges from approximately 1mM to approximately 50mM.

13. The reversible electrodeposition device according to claim 7, wherein the device is an electrochromic window.

14. A reversible electrodeposition device, comprising:

- a first substrate having an electrically conductive material associated therewith;
- a second substrate having an electrically conductive material associated therewith;
- a nucleation layer at least partially covering at least one of the electrically conductive materials of the first and second substrates;
- an electrochemical medium contained within a chamber positioned between the first and second substrates which comprises:
    - at least one solvent;
    - an anodic electroactive material; and
    - a cathodic electroactive material, wherein the concentration of the anodic electroactive material is greater than the cathodic electroactive material, to, in turn, enhance the electrochemical performance of the electrodeposition device.

15. The reversible electrodeposition device according to claim 14, wherein the electrochemical medium further comprises a redox buffer.

16. The reversible electrodeposition device according to claim 15, wherein the redox buffer is more easily reduced than the cathodic material.

17. The reversible electrodeposition device according to claim 15, wherein the redox buffer is more easily oxidized than the anodic material.

18. The reversible electrodeposition device according to claim 15, wherein the redox buffer comprises: a first component that is more easily reduced than the cathodic material; and a second component that is more easily oxidized than the anodic material.

19. The reversible electrodeposition device according to claim 14, wherein the cathodic material comprises a salt of an active metal.

20. The reversible electrodeposition device according to claim 15, wherein the concentration of the redox buffer ranges from approximately 1mM to approximately 50mM.

21. The reversible electrodeposition device according to claim 15, wherein the electrochemical medium further comprises a complexing agent.

22. The reversible electrodeposition device according to claim 14, wherein the device is an electrochromic window.

23. A reversible electrodeposition device, comprising:

- a first substrate having an electrically conductive material associated therewith;

- a second substrate having an electrically conductive material associated therewith;

- a nucleation layer at least partially associated with at least one of the electrically conductive materials of the first and second substrates;

- an electrochemical medium contained within a chamber positioned between the first and second substrates which comprises:

  - at least one solvent;

  - an anodic electroactive material;

  - a cathodic electroactive material, wherein the concentration of the anodic electroactive material is greater than the cathodic electroactive material; and

  - a redox buffer.

24. A reversible electrodeposition device, comprising:

- a first substrate having an electrically conductive material associated therewith;
- a second substrate having an electrically conductive material associated therewith;
- a nucleation layer at least partially covering at least one of the electrically conductive materials of the first and second substrates;
- an electrochemical medium contained within a chamber positioned between the first and second substrates which comprises:
    - at least one solvent;
    - an anodic electroactive material;
    - a cathodic electroactive material; and
- means associated with the electrochemical medium which enhances the electrochemical performance of the electrodeposition device.

25. A reversible electrodeposition window having a non-patterned electrode, comprising:

- a first electrode comprising a first substrate having an electrically conductive material associated therewith;
- a second, non-patterned electrode comprising a second substrate having an electrically conductive material associated therewith;
- a nucleation layer at least partially covering the electrically conductive material of the first substrate;
- an electrochemical medium contained within a chamber positioned between the first and second substrates which comprises:
  - at least one solvent;
  - an anodic electroactive material; and
  - a cathodic electroactive material.

26. The reversible electrodeposition window according to claim 25, wherein the electrochemical medium further comprises a redox buffer.

27. The reversible electrodeposition window according to claim 26, wherein the redox buffer is more easily reduced than the cathodic material.

28. The reversible electrodeposition window according to claim 26, wherein the redox buffer is more easily oxidized than the anodic material.

29. The reversible electrodeposition window according to claim 26, wherein the redox buffer comprises: a first component that is more easily reduced than the cathodic material; and a second component that is more easily oxidized than the anodic material.

30. The reversible electrodeposition window according to claim 25, wherein the cathodic material comprises a salt of an active metal.

31. The reversible electrodeposition window according to claim 26, wherein the concentration of the redox buffer ranges from approximately 1mM to approximately 50mM.

32. The reversible electrodeposition window according to claim 25, wherein the concentration of the anodic electroactive material is greater than the cathodic electroactive material.

33. The reversible electrodeposition window according to claim 25, wherein the electrochemical medium further comprises a complexing agent.

34. A reversible electrodeposition device having a non-patterned electrode, comprising:

- a first electrode comprising a first substrate having an electrically conductive material associated therewith;

- a second, non-patterned electrode comprising a second substrate having an electrically conductive material associated therewith;

- a nucleation layer at least partially covering the electrically conductive material of the first substrate;

- an electrochemical medium contained within a chamber positioned between the first and second substrates which comprises:

  - at least one solvent;

  - at least one anodic electroactive material, wherein the at least one anodic electroactive material is present in solution phase; and

  - a cathodic electroactive material.

35. The reversible electrodeposition device according to claim 34, wherein the electrochemical medium further comprises a redox buffer.

36. The reversible electrodeposition device according to claim 35, wherein the redox buffer is more easily reduced than the cathodic material.

37. The reversible electrodeposition device according to claim 35, wherein the redox buffer is more easily oxidized than the at least one anodic material.

38. The reversible electrodeposition device according to claim 35, wherein the redox buffer comprises: a first component that is more easily reduced than the cathodic material; and a second component that is more easily oxidized than the anodic material.

39. The reversible electrodeposition device according to claim 34, wherein the cathodic material comprises a salt of an active metal.

40. The reversible electrodeposition device according to claim 35, wherein the concentration of the redox buffer ranges from approximately 1mM to approximately 50mM.

41. The reversible electrodeposition device according to claim 34, wherein the concentration of the at least one anodic electroactive material is greater than the cathodic electroactive material.

42. The reversible electrodeposition device according to claim 34, wherein the electrochemical medium further comprises a complexing agent.

43. The reversible electrodeposition device according to claim 34, wherein the electrochemical medium comprises at least one surface attached anodic material.

44. The reversible electrodeposition device according to claim 34, wherein the same comprises a window.